



## SUBSTITUTE SEQUENCE LISTING

<110> ADNEY, WILLIAM S.  
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DECKER, STEPHEN R.  
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<140> 09/917,384

<141> 2001-07-28

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<170> PatentIn Ver. 2.1

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625					630					635					640

<210> 6  
 <211> 85  
 <212> PRT  
 <213> Acidothermus cellulolyticus

<400> 6															
Asp	Thr	Thr	Pro	Pro	Ser	Val	Pro	Thr	Gly	Leu	Gln	Val	Thr	Gly	Thr
1				5					10					15	
Thr	Thr	Ser	Ser	Val	Ser	Leu	Ser	Trp	Thr	Ala	Ser	Thr	Asp	Asn	Val
			20					25					30		
Gly	Val	Ala	His	Tyr	Asn	Val	Tyr	Arg	Asn	Gly	Thr	Leu	Val	Gly	Gln
		35					40					45			
Pro	Thr	Ala	Thr	Ser	Phe	Thr	Asp	Thr	Gly	Leu	Ala	Ala	Gly	Thr	Ser
	50					55					60				
Tyr	Thr	Tyr	Thr	Val	Ala	Ala	Val	Asp	Ala	Ala	Gly	Asn	Thr	Ser	Ala
65					70					75					80
Gln	Ser	Phe	Ala	Gly											
				85											

<210> 7

<211> 101  
<212> PRT  
<213> Acidothermus cellulolyticus

<400> 7

Gly Ala Ser Cys Thr Ala Thr Tyr Val Val Asn Ser Asp Trp Gly Ser  
1 5 10 15  
Gly Phe Thr Thr Thr Val Thr Val Thr Asn Thr Gly Thr Arg Ala Thr  
20 25 30  
Ser Gly Trp Thr Val Thr Trp Ser Phe Ala Gly Asn Gln Thr Val Thr  
35 40 45  
Asn Tyr Trp Asn Thr Ala Leu Thr Gln Ser Gly Lys Ser Val Thr Ala  
50 55 60  
Lys Asn Leu Ser Tyr Asn Asn Val Ile Gln Pro Gly Gln Ser Thr Thr  
65 70 75 80  
Phe Gly Phe Asn Gly Ser Tyr Ser Gly Thr Asn Thr Ala Pro Thr Leu  
85 90 95  
Ser Cys Thr Ala Ser  
100

<210> 8  
<211> 6  
<212> PRT  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic  
histidine tag

<400> 8

His His His His His His  
1 5

<210> 9  
<211> 638  
<212> PRT  
<213> Acidothermus cellulolyticus

<400> 9

Pro Tyr Ile Gln Arg Phe Leu Thr Met Tyr Asn Lys Ile His Asp Pro  
1 5 10 15  
Ala Asn Gly Tyr Phe Ser Pro Gln Gly Ile Pro Tyr His Ser Val Glu  
20 25 30  
Thr Leu Ile Val Glu Ala Pro Asp Tyr Gly His Glu Thr Thr Ser Glu  
35 40 45  
Ala Tyr Ser Phe Trp Leu Trp Leu Glu Ala Thr Tyr Gly Ala Val Thr

50					55					60					
Gly	Asn	Trp	Thr	Pro	Phe	Asn	Asn	Ala	Trp	Thr	Thr	Met	Glu	Thr	Tyr
65					70					75					80
Met	Ile	Pro	Gln	His	Ala	Asp	Gln	Pro	Asn	Asn	Ala	Ser	Tyr	Asn	Pro
				85					90					95	
Asn	Ser	Pro	Ala	Ser	Tyr	Ala	Pro	Glu	Glu	Pro	Leu	Pro	Ser	Met	Tyr
			100					105					110		
Pro	Val	Ala	Ile	Asp	Ser	Ser	Val	Pro	Val	Gly	His	Asp	Pro	Leu	Ala
			115				120					125			
Ala	Glu	Leu	Gln	Ser	Thr	Tyr	Gly	Thr	Pro	Asp	Ile	Tyr	Gly	Met	His
	130					135					140				
Trp	Leu	Ala	Asp	Val	Asp	Asn	Ile	Tyr	Gly	Tyr	Gly	Asp	Ser	Pro	Gly
145					150					155					160
Gly	Gly	Cys	Glu	Leu	Gly	Pro	Ser	Ala	Lys	Gly	Val	Ser	Tyr	Ile	Asn
				165					170					175	
Thr	Phe	Gln	Arg	Gly	Ser	Gln	Glu	Ser	Val	Trp	Glu	Thr	Val	Thr	Gln
			180					185					190		
Pro	Thr	Cys	Asp	Asn	Gly	Lys	Tyr	Gly	Gly	Ala	His	Gly	Tyr	Val	Asp
			195				200					205			
Leu	Phe	Ile	Gln	Gly	Ser	Thr	Pro	Pro	Gln	Trp	Lys	Tyr	Thr	Asp	Ala
	210					215					220				
Pro	Asp	Ala	Asp	Ala	Arg	Ala	Val	Gln	Ala	Ala	Tyr	Trp	Ala	Tyr	Thr
225					230					235					240
Trp	Ala	Ser	Ala	Gln	Gly	Lys	Ala	Ser	Ala	Ile	Ala	Pro	Thr	Ile	Ala
				245					250					255	
Lys	Ala	Ser	Gln	Thr	Gly	Asp	Tyr	Leu	Arg	Tyr	Ser	Leu	Phe	Asp	Lys
			260					265					270		
Tyr	Phe	Lys	Gln	Val	Gly	Asn	Cys	Tyr	Pro	Ala	Ser	Ser	Cys	Pro	Gly
		275				280					285				
Ala	Thr	Gly	Arg	Gln	Ser	Glu	Thr	Tyr	Leu	Ile	Gly	Trp	Tyr	Tyr	Ala
	290					295					300				
Trp	Gly	Gly	Ser	Ser	Gln	Gly	Trp	Ala	Trp	Arg	Ile	Gly	Asp	Gly	Ala
305					310					315					320
Ala	His	Phe	Gly	Tyr	Gln	Asn	Pro	Leu	Ala	Ala	Trp	Ala	Met	Ser	Asn
				325					330					335	
Val	Thr	Pro	Leu	Ile	Pro	Leu	Ser	Pro	Thr	Ala	Lys	Ser	Asp	Trp	Ala
			340					345					350		
Ala	Ser	Leu	Gln	Arg	Gln	Leu	Glu	Phe	Tyr	Gln	Trp	Leu	Gln	Ser	Ala

355					360					365					
Glu	Gly	Ala	Ile	Ala	Gly	Gly	Ala	Thr	Asn	Ser	Trp	Asn	Gly	Asn	Tyr
	370					375					380				
Gly	Thr	Pro	Pro	Ala	Gly	Asp	Ser	Thr	Phe	Tyr	Gly	Met	Ala	Tyr	Asp
385					390					395					400
Trp	Glu	Pro	Val	Tyr	His	Asp	Pro	Pro	Ser	Asn	Asn	Trp	Phe	Gly	Phe
				405					410					415	
Gln	Ala	Trp	Ser	Met	Glu	Arg	Val	Ala	Glu	Tyr	Tyr	Tyr	Val	Thr	Gly
			420					425					430		
Asp	Pro	Lys	Ala	Lys	Ala	Leu	Leu	Asp	Lys	Trp	Val	Ala	Trp	Val	Lys
		435					440					445			
Pro	Asn	Val	Thr	Thr	Gly	Ala	Ser	Trp	Ser	Ile	Pro	Ser	Asn	Leu	Ser
	450					455					460				
Trp	Ser	Gly	Gln	Pro	Asp	Thr	Trp	Asn	Pro	Ser	Asn	Pro	Gly	Thr	Asn
465					470					475					480
Ala	Asn	Leu	His	Val	Thr	Ile	Thr	Ser	Ser	Gly	Gln	Asp	Val	Gly	Val
				485					490					495	
Ala	Ala	Ala	Leu	Ala	Lys	Thr	Leu	Glu	Tyr	Tyr	Ala	Ala	Lys	Ser	Gly
			500					505					510		
Asp	Thr	Ala	Ser	Arg	Asp	Leu	Ala	Lys	Gly	Leu	Leu	Asp	Ser	Met	Trp
		515				520						525			
Asn	Asn	Asp	Gln	Asp	Ser	Leu	Gly	Val	Ser	Thr	Pro	Glu	Thr	Arg	Thr
	530					535					540				
Asp	Tyr	Ser	Arg	Phe	Thr	Gln	Val	Tyr	Asp	Pro	Thr	Thr	Gly	Asp	Gly
545					550					555					560
Leu	Tyr	Ile	Pro	Ser	Gly	Trp	Thr	Gly	Thr	Met	Pro	Asn	Gly	Asp	Gln
				565				570						575	
Ile	Lys	Pro	Gly	Ala	Thr	Phe	Leu	Ser	Ile	Arg	Ser	Trp	Tyr	Thr	Lys
			580					585					590		
Asp	Pro	Gln	Trp	Ser	Lys	Val	Gln	Ala	Tyr	Leu	Asn	Gly	Gly	Pro	Ala
		595					600					605			
Pro	Thr	Phe	Asn	Tyr	His	Arg	Phe	Trp	Ala	Glu	Ser	Asp	Phe	Ala	Met
	610					615					620				
Ala	Asn	Ala	Asp	Phe	Gly	Met	Leu	Phe	Pro	Ser	Gly	Ser	Pro		
625					630					635					

<210> 10

<211> 640

<212> PRT

<213> Cellulomonas fimi

<400> 10

Glu	Tyr	Ala	Gln	Arg	Phe	Leu	Ala	Gln	Tyr	Asp	Lys	Ile	Lys	Asp	Pro	
1				5					10					15		
Ala	Asn	Gly	Tyr	Phe	Ser	Ala	Gln	Gly	Ile	Pro	Tyr	His	Ala	Val	Glu	
		20						25					30			
Thr	Leu	Met	Val	Glu	Ala	Pro	Asp	Tyr	Gly	His	Glu	Thr	Thr	Ser	Glu	
		35					40					45				
Ala	Tyr	Ser	Tyr	Trp	Leu	Trp	Leu	Glu	Ala	Leu	Tyr	Gly	Gln	Val	Thr	
	50					55					60					
Gln	Asp	Trp	Ala	Pro	Leu	Asn	His	Ala	Trp	Asp	Thr	Met	Glu	Lys	Tyr	
65					70					75					80	
Met	Ile	Pro	Gln	Ser	Val	Asp	Gln	Pro	Thr	Asn	Ser	Phe	Tyr	Asn	Pro	
				85					90					95		
Asn	Ser	Pro	Ala	Thr	Tyr	Ala	Pro	Glu	Phe	Asn	His	Pro	Ser	Ser	Tyr	
			100					105					110			
Pro	Ser	Gln	Leu	Asn	Ser	Gly	Ile	Ser	Gly	Gly	Thr	Asp	Pro	Ile	Gly	
		115					120					125				
Ala	Glu	Leu	Lys	Ala	Thr	Tyr	Gly	Asn	Ala	Asp	Val	Tyr	Gln	Met	His	
	130						135				140					
Trp	Leu	Ala	Asp	Val	Asp	Asn	Ile	Tyr	Gly	Phe	Gly	Ala	Thr	Pro	Gly	
145					150					155					160	
Ala	Gly	Cys	Thr	Leu	Gly	Pro	Thr	Ala	Thr	Gly	Thr	Ser	Phe	Ile	Asn	
				165					170					175		
Thr	Phe	Gln	Arg	Gly	Pro	Gln	Glu	Ser	Val	Trp	Glu	Thr	Val	Pro	Gln	
		180						185					190			
Pro	Ser	Cys	Glu	Glu	Phe	Lys	Tyr	Gly	Gly	Lys	Asn	Gly	Tyr	Leu	Asp	
		195					200					205				
Leu	Phe	Thr	Lys	Asp	Ala	Ser	Tyr	Ala	Lys	Gln	Trp	Lys	Tyr	Thr	Ser	
	210					215					220					
Ala	Ser	Asp	Ala	Asp	Ala	Arg	Ala	Val	Glu	Ala	Val	Tyr	Trp	Ala	Asn	
225					230					235					240	
Gln	Trp	Ala	Thr	Glu	Gln	Gly	Lys	Ala	Ala	Asp	Val	Ala	Ala	Thr	Val	
				245					250					255		
Ala	Lys	Ala	Ala	Lys	Met	Gly	Asp	Tyr	Leu	Arg	Tyr	Thr	Leu	Phe	Asp	
		260						265					270			
Lys	Tyr	Phe	Lys	Lys	Ile	Gly	Cys	Thr	Ser	Pro	Thr	Cys	Ala	Ala	Gly	
		275					280					285				

Gln	Gly	Arg	Glu	Ala	Ala	His	Tyr	Leu	Leu	Ser	Trp	Tyr	Met	Ala	Trp	290	295	300
Gly	Gly	Ala	Thr	Asp	Thr	Ser	Ser	Gly	Trp	Ala	Trp	Arg	Ile	Gly	Ser	305	310	315
Ser	His	Ala	His	Phe	Gly	Tyr	Gln	Asn	Pro	Leu	Ala	Ala	Trp	Ala	Leu	325	330	335
Ser	Thr	Asp	Pro	Lys	Leu	Thr	Pro	Lys	Ser	Pro	Thr	Ala	Lys	Ala	Asp	340	345	350
Trp	Ala	Ala	Ser	Met	Gln	Arg	Gln	Leu	Glu	Phe	Tyr	Thr	Trp	Leu	Gln	355	360	365
Ala	Ser	Asn	Gly	Gly	Ile	Ala	Gly	Gly	Ala	Thr	Asn	Ser	Trp	Asp	Gly	370	375	380
Ala	Tyr	Ala	Gln	Pro	Pro	Ala	Gly	Thr	Pro	Thr	Phe	Tyr	Gly	Met	Gly	385	390	395
Tyr	Thr	Glu	Ala	Pro	Val	Tyr	Val	Asp	Pro	Pro	Ser	Asn	Arg	Trp	Phe	405	410	415
Gly	Met	Gln	Ala	Trp	Gly	Val	Gln	Arg	Val	Ala	Glu	Leu	Tyr	Tyr	Ala	420	425	430
Ser	Gly	Asn	Ala	Gln	Ala	Lys	Lys	Ile	Leu	Asp	Lys	Trp	Val	Pro	Trp	435	440	445
Val	Val	Ala	Asn	Ile	Ser	Thr	Asp	Gly	Ala	Ser	Trp	Lys	Val	Pro	Ser	450	455	460
Glu	Leu	Lys	Trp	Thr	Gly	Lys	Pro	Asp	Thr	Trp	Asn	Ala	Ala	Ala	Pro	465	470	475
Thr	Gly	Asn	Pro	Gly	Leu	Thr	Val	Glu	Val	Thr	Ser	Tyr	Gly	Gln	Asp	485	490	495
Val	Gly	Val	Ala	Ala	Asp	Thr	Ala	Arg	Ala	Leu	Leu	Phe	Tyr	Ala	Ala	500	505	510
Lys	Ser	Gly	Asp	Thr	Ala	Ser	Arg	Asp	Lys	Ala	Lys	Ala	Leu	Leu	Asp	515	520	525
Ala	Ile	Trp	Ala	Asn	Asn	Gln	Asp	Pro	Leu	Gly	Val	Ser	Ala	Val	Glu	530	535	540
Thr	Arg	Gly	Asp	Tyr	Lys	Arg	Phe	Asp	Asp	Thr	Tyr	Val	Ala	Asn	Gly	545	550	555
Asp	Gly	Ile	Tyr	Ile	Pro	Ser	Gly	Trp	Thr	Gly	Thr	Met	Pro	Asn	Gly	565	570	575
Asp	Val	Ile	Lys	Pro	Gly	Val	Ser	Phe	Leu	Asp	Ile	Arg	Ser	Phe	Tyr	580	585	590

Lys Lys Asp Pro Asn Trp Ser Lys Val Gln Thr Phe Leu Asp Gly Gly  
595 600 605

Ala Glu Pro Gln Phe Arg Tyr His Arg Phe Trp Ala Gln Thr Ala Val  
610 615 620

Ala Gly Ala Leu Ala Asp Tyr Ala Arg Leu Phe Asp Asp Gly Thr Thr  
625 630 635 640

<210> 11

<211> 642

<212> PRT

<213> Thermobifida fusca

<400> 11

Ser Tyr Asp Gln Ala Phe Leu Glu Gln Tyr Glu Lys Ile Lys Asp Pro  
1 5 10 15

Ala Ser Gly Tyr Phe Arg Glu Phe Asn Gly Leu Leu Val Pro Tyr His  
20 25 30

Ser Val Glu Thr Met Ile Val Glu Ala Pro Asp His Gly His Gln Thr  
35 40 45

Thr Ser Glu Ala Phe Ser Tyr Tyr Leu Trp Leu Glu Ala Tyr Tyr Gly  
50 55 60

Arg Val Thr Gly Asp Trp Lys Pro Leu His Asp Ala Trp Glu Ser Met  
65 70 75 80

Glu Thr Phe Ile Ile Pro Gly Thr Lys Asp Gln Pro Thr Asn Ser Ala  
85 90 95

Tyr Asn Pro Asn Ser Pro Ala Thr Tyr Ile Pro Glu Gln Pro Asn Ala  
100 105 110

Asp Gly Tyr Pro Ser Pro Leu Met Asn Asn Val Pro Val Gly Gln Asp  
115 120 125

Pro Leu Ala Gln Glu Leu Ser Ser Thr Tyr Gly Thr Asn Glu Ile Tyr  
130 135 140

Gly Met His Trp Leu Leu Asp Val Asp Asn Val Tyr Gly Phe Gly Phe  
145 150 155 160

Cys Gly Asp Gly Thr Asp Asp Ala Pro Ala Tyr Ile Asn Thr Tyr Gln  
165 170 175

Arg Gly Ala Arg Glu Ser Val Trp Glu Thr Ile Pro His Pro Ser Cys  
180 185 190

Asp Asp Phe Thr His Gly Gly Pro Asn Gly Tyr Leu Asp Leu Phe Thr  
195 200 205

Asp Asp Gln Asn Tyr Ala Lys Gln Trp Arg Tyr Thr Asn Ala Pro Asp  
210 215 220

Ala	Asp	Ala	Arg	Ala	Val	Gln	Val	Met	Phe	Trp	Ala	His	Glu	Trp	Ala	225	230	235	240
Lys	Glu	Gln	Gly	Lys	Glu	Asn	Glu	Ile	Ala	Gly	Leu	Met	Asp	Lys	Ala	245	250	255	
Ser	Lys	Met	Gly	Asp	Tyr	Leu	Arg	Tyr	Ala	Met	Phe	Asp	Lys	Tyr	Phe	260	265	270	
Lys	Lys	Ile	Gly	Asn	Cys	Val	Gly	Ala	Thr	Ser	Cys	Pro	Gly	Gly	Gln	275	280	285	
Gly	Lys	Asp	Ser	Ala	His	Tyr	Leu	Leu	Ser	Trp	Tyr	Tyr	Ser	Trp	Gly	290	295	300	
Gly	Ser	Leu	Asp	Thr	Ser	Ser	Ala	Trp	Ala	Trp	Arg	Ile	Gly	Ser	Ser	305	310	315	320
Ser	Ser	His	Gln	Gly	Tyr	Gln	Asn	Val	Leu	Ala	Ala	Tyr	Ala	Leu	Ser	325	330	335	
Gln	Val	Pro	Glu	Leu	Gln	Pro	Asp	Ser	Pro	Thr	Gly	Val	Gln	Asp	Trp	340	345	350	
Ala	Thr	Ser	Phe	Asp	Arg	Gln	Leu	Glu	Phe	Leu	Gln	Trp	Leu	Gln	Ser	355	360	365	
Ala	Glu	Gly	Gly	Ile	Ala	Gly	Gly	Ala	Thr	Asn	Ser	Trp	Lys	Gly	Ser	370	375	380	
Tyr	Asp	Thr	Pro	Pro	Thr	Gly	Leu	Ser	Gln	Phe	Tyr	Gly	Met	Tyr	Tyr	385	390	395	400
Asp	Trp	Gln	Pro	Val	Trp	Asn	Asp	Pro	Pro	Ser	Asn	Asn	Trp	Phe	Gly	405	410	415	
Phe	Gln	Val	Trp	Asn	Met	Glu	Arg	Val	Ala	Gln	Leu	Tyr	Tyr	Val	Thr	420	425	430	
Gly	Asp	Ala	Arg	Ala	Glu	Ala	Ile	Leu	Asp	Lys	Trp	Val	Pro	Trp	Ala	435	440	445	
Ile	Gln	His	Thr	Asp	Val	Asp	Ala	Asp	Asn	Gly	Gly	Gln	Asn	Phe	Gln	450	455	460	
Val	Pro	Ser	Asp	Leu	Glu	Trp	Ser	Gly	Gln	Pro	Asp	Thr	Trp	Thr	Gly	465	470	475	480
Thr	Tyr	Thr	Gly	Asn	Pro	Asn	Leu	His	Val	Gln	Val	Val	Ser	Tyr	Ser	485	490	495	
Gln	Asp	Val	Gly	Val	Thr	Ala	Ala	Leu	Ala	Lys	Thr	Leu	Met	Tyr	Tyr	500	505	510	
Ala	Lys	Arg	Ser	Gly	Asp	Thr	Thr	Ala	Leu	Ala	Thr	Ala	Glu	Gly	Leu	515	520	525	



Leu Asp Ala Leu Leu Ala His Arg Asp Ser Ile Gly Ile Ala Thr Pro  
530 535 540

Glu Gln Pro Ser Trp Asp Arg Leu Asp Asp Pro Trp Asp Gly Ser Glu  
545 550 555 560

Gly Leu Tyr Val Pro Pro Gly Trp Ser Gly Thr Met Pro Asn Gly Asp  
565 570 575

Arg Ile Glu Pro Gly Ala Thr Phe Leu Ser Ile Arg Ser Phe Tyr Lys  
580 585 590

Asn Asp Pro Leu Trp Pro Gln Val Glu Ala His Leu Asn Asp Pro Gln  
595 600 605

Asn Val Pro Ala Pro Ile Val Glu Arg His Arg Phe Trp Ala Gln Val  
610 615 620

Glu Ile Ala Thr Ala Phe Ala Ala His Asp Glu Leu Phe Gly Ala Gly  
625 630 635 640

Ala Pro